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SHEEP PROGRAM

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Abstract: Approximately 80 percent of desert bighorn sheep habitat is on Federal land, the majority of which is administered by the Bureau of Land Management (BLM). Given the precarious status of desert bighorn populations, this situation provides BLM a unique opportunity to enhance their recovery. The experience of the last two decades has demonstrated that bighorn sheep populations can be increased on lands managed for multiple uses. For the past 20 years, BLM wildlife biologists have been involved in desert bighorn sheep management. The earliest work focused on habitat management, primarily water development. In the last decade, BLM has cooperated with State wildlife agencies to re-introduce sheep into their historic ranges. In most cases, these efforts have been quite successful. However, they continue to be a piecemeal or "herd-by-herd" approach to management, with little rangewide perspective. In 1984 Congress provided BLM with a challenge grant of \$300,000 to initiate a program for recovery of desert bighorn sheep. These monies were to be matched by private contributions of money or in-kind services. In Fiscal Year 1985, over \$900,000 were spent by BLM on desert bighorn. This included the grant, base funding, and contributed monies and services. Most of this money was spent on project work. In Fiscal Year 1986, the effort will be expanded to include development of a rangewide plan and initiation of a research effort. The rangewide plan will provide for a coordinated program of inventory, land use planning, project work, monitoring, and research that is consistent with State agency and BLM goals. The research effort will be a part of an overall rangewide recovery plan and will concentrate on six major areas of concern: (1) habitat evaluation methodology; (2) effective mitigation methods; (3) nutritional requirements; (4) impacts of disease; (5) effects of habitat fragmentation; and (6) livestock impacts on desert bighorn. Increased knowledge of these topics should provide a better basis for future management. BLM is optimistic that continuing support for and implementation of this rangewide plan will result in a recovery of desert bighorn comparable to the recovery of other big game species in this country such as mule deer.

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In this paper, I will review the efforts of the BLM in desert bighorn sheep habitat management over the past 20 years, report recent events and activities, and describe plans for the future direction of the recovery program.

PAST EFFORTS

BLM's efforts in desert bighorn sheep management precede the beginning of a formal wildlife program in the agency. As early as 1960, BLM range managers were actively working with biologists from state agencies to improve desert bighorn habitat. In 1960, a BLM range manager presented a paper to the Desert Bighorn Council that outlined the BLM's management responsibilities and practices relating to desert bighorn habitat (Mathews 1960). These practices--cooperation with state wildlife agencies, conservative use of bighorn ranges by livestock, water development, avoidance of shifts from cattle to domestic sheep use, and preservation of critical areas in public ownership--have remained a cornerstone of BLM efforts for desert bighorn since that time. With the hiring of wildlife biologists, beginning in 1961, and the establishment of a wildlife program in 1965, efforts for recovery of desert bighorn sheep have increased.

Although BLM's wildlife program was in its infancy and had to operate with limited personnel and funding, a substantial record of accomplishments in desert bighorn habitat management exists, particularly in Nevada and Utah. A few milestones, as indicated by published reports, serve to indicate BLM's

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BLM'S DESERT BIGHORN SHEEP PROGRAM

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INTRODUCTION

Populations of desert bighorn sheep in the southwestern United States (Ovis canadensis subspecies cremnobates, mexicana, and nelsoni) have declined drastically since the early 1800s (Buechner 1960). This decline has been attributed to several factors including exploitive hunting, disease, habitat destruction, and especially overgrazing by livestock. Legal hunting is no longer a cause of decline nor a factor preventing recovery (Kelly 1980), and some herds in areas where the habitat has recovered have begun to increase since around 1950 (Cooperrider 1985). Future recovery of desert bighorns will thus be largely through habitat rather than population management (Cooperrider 1985; Wilson 1975).

About 80 percent of desert bighorn sheep habitat is on federal land, the majority of which is administered by the Bureau of Land Management (BLM) (Figures 1, 2). This situation provides a unique opportunity for BLM to work cooperatively with states to enhance recovery. BLM biologists and managers have been working with state wildlife agencies and private individuals to enhance bighorn sheep habitat for over 20 years. However, recent events and increasing awareness and concern for desert bighorns have provided the opportunity to increase and strengthen this effort.

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activity during the 1960s. BLM personnel were responsible for the first review of bighorn reintroduction efforts (Yoakum 1963), one of the first studies of desert bighorn food habits (Yoakum 1964), the first major range improvement program for desert bighorn (Call 1966), the first survey of desert bighorn distribution in southeastern Utah (Wilson 1967), and the first habitat management plan for desert bighorn (Warburton 1969).

Most of these efforts were initiated, coordinated, and conducted at the local or state level; therefore, complete summary statistics on numbers of projects, acres of habitat, and other factors are not easily obtained. However, a few records exemplify the level of involvement. BLM maintains computer-based records of all on-the-ground rangeland improvement projects involving substantial purchases of materials or significant commitments of labor for construction that required periodic maintenance, such as fences and seedings projects and water developments. As of the end of 1985, BLM built and was maintaining projects for desert bighorn costing over \$500,000. Since BLM's budget for wildlife was only three million dollars in 1974, this amount indicates a strong interest and concern for desert bighorns.

BLM has also participated fully in reintroduction programs and follow-up monitoring (McQuivey and Pulliam 1981), as well as sponsored numerous studies and research efforts. In 1973, a survey of desert bighorn habitat and potential habitat on BLM lands (Yoakum 1973) indicated that over 7,000 bighorn or roughly 70 percent of the desert bighorn population in the southwestern United States was on BLM lands (Table 1). Furthermore, the survey indicated an additional 91 sites on six million acres of historical habitat were suitable for reintroduction of desert bighorn.

Up until this time, the major emphasis in the program had been in habitat improvement and protection, particularly water development and segregation of bighorn areas from incompatible uses. With the identification of areas of suitable unoccupied habitat coupled with the development of techniques for trapping and transporting surplus sheep, many states began active reintroduction programs. The state wildlife agencies in Nevada and Arizona have been particularly active in these efforts. Most of these reintroductions have been into areas in which all or most of the habitat is on BLM lands. BLM personnel have participated actively in this program by providing support to transplant sheep and monitor habitat and populations following such transplants. Many of these reintroductions have been quite successful and this program as well as earlier activities are being continued.

Finally, BLM has the responsibility for regulating livestock grazing and other land uses on BLM lands that may be detrimental to bighorn sheep and their habitat. In many cases, such conflicts can be minimized by redirecting incompatible activities away from areas occupied by desert bighorn. In other cases, conflicts cannot be easily mitigated and the BLM managers must decide between competing uses. Such decisions require good information on sheep populations and habitat use as well as impacts on bighorn sheep from the alternative land use. Unfortunately such information is often not available or based on very little data.

CURRENT EFFORTS

In fiscal year 1985, Congress appropriated a Challenge Grant of \$300,000 to BLM specifically to facilitate the recovery of desert bighorn sheep. The

appropriation stipulated that the grant be matched by private sector-funding or in-kind services. With these funds, together with matching funds and in-kind services, BLM initiated 28 projects in addition to ongoing actions from base funds. These included

- 18 water developments in Arizona, Nevada, and New Mexico;
- 4 reintroductions (Ives Peak, Paria Canyon, Grand Wash Cliffs, and Gila Box) in Arizona;
- 4 habitat inventory/monitoring efforts in Arizona; and
- 2 research studies in California and Utah, directed at determining causes of lamb mortality.

In fiscal year 1986, this special appropriation was continued with the same conditions and approximately the same level of funding. These funds will be used for the same types of efforts (water development, reintroductions, habitat inventory and monitoring, studies, and research).

In addition, BLM is developing a rangewide plan for managing desert bighorn sheep. This plan will consist of rangewide strategies and guidelines for carrying out BLM's recovery of desert bighorn sheep. The plan will be used by the BLM Washington Office to allocate funds between states, and by BLM state directors, to allocate funds between projects within a state. Many of the past efforts were planned and done at the local level for a particular range or sheep herd. Although this approach was often successful, it did not always

result in the most efficient use of funds appropriated at the national level. A rangewide perspective and plan will help ensure the most effective use of the limited funds available to BLM for future desert bighorn sheep habitat management. The plan should be completed in 1986.

BLM does not intend to develop a rangewide plan by diverting funds and energy into an extended planning effort, but rather to provide a concise statement of measurable and attainable goals, the steps necessary to achieve these goals, and the priorities among the goals. Although goals and priorities within a state may be available or easily developed and agreed upon, priorities among states may be more difficult to establish. Consider the following questions: Is the need for funds to expand the range of bighorn sheep in one state greater than the need for funds for maintaining populations in another? Are some subspecies of desert bighorn sheep more important than others? These questions and others need to be addressed and resolved in a rangewide plan.

FUTURE ACTIVITIES

The rangewide plan described will provide direction for the future. Although details of the plan are still being developed, the program will continue to feature the following:

- close cooperation with the state agencies in all aspects of the program;
- use of private sector contributions of funds and in-kind services whenever available;

- a balanced and integrated program of inventory, on-the-ground projects, and monitoring; and
- research and development.

Cooperation with State Wildlife Agencies

The BLM has always cooperated closely with the state wildlife agencies in desert bighorn efforts and will continue to do so in the future. The rangewide plan will incorporate state agency objectives. For instance the Nevada Department of Wildlife has had a cooperative plan and program with BLM since 1976. This program has resulted in 16 successful reintroductions of desert bighorn into historic ranges as well as numerous on-the-ground habitat improvement projects. This year, Arizona, New Mexico, and Utah are developing similar statewide plans either jointly or in close cooperation with the state wildlife agency.

Use of Private Sector Contributions

The state of Nevada and BLM through the cooperative program mentioned above, have used over \$250,000 in private contributions since 1976. This use of private sector contributions was part of the program long before the 1984 Challenge Grant was appropriated. However, during the last two years since the grant was initiated, over \$600,000 in contributed funds and labor have been used by the BLM in cooperative efforts for desert bighorn. In a period of limited funding, these contributions have been crucial to the program and such support will continue to be essential.

Balanced and Integrated Program.

Efficient use of funds requires an integrated program in which essential tasks are coordinated. Inventories of desert bighorn habitat and populations need to be completed before effective management actions can begin. These need to be completed, not only on areas with existing sheep populations, but also on historic ranges where reintroductions are being considered. Although techniques for physically capturing and transporting desert bighorn are well-developed, knowledge of how to successfully reestablish bighorns into historic ranges is still primitive.

Management projects are generally the core of any program. On-the-ground projects such as desert bighorn reintroductions, water developments, fencing for livestock exclusion, and seedings will continue to be essential to the program. However, BLM has responsibilities for projects on the land in addition to those for wildlife or desert bighorns. Correct decisions on these other activities are just as essential to the program as direct projects. A decision to route a power line or road around a sheep range rather than through it may be of more long-term benefit than development of one more guzzler. These decisions as well as decisions about bighorn projects require good inventories and knowledge of desert bighorn.

Monitoring is essential to any sound wildlife management program. Knowledge of desert bighorn management has increased dramatically in the last 30 years, but much needs to be learned. Management actions need to be monitored so that

we learn from our mistakes as well as our successes. Such monitoring will allow us to design better projects in the future, to make better decisions about managing of desert bighorn habitat, and to ensure that we are achieving our management objectives.

Research and Development

Research and development will continue to be needed. BLM has identified five major subject areas that need to be pursued through a research and development effort:

- disease and genetics,
- nutritional requirements,
- impacts of domestic livestock and feral animals,
- habitat evaluation techniques, and
- methods for mitigating human disturbance and improving habitat.

Consideration of one of these topics, disease and genetics, illustrates the complexity of the problem and the need for research. Catastrophic deaths from disease continue to be major problems with desert bighorn sheep, often resulting in losses of entire herds. Some of these herds are in ranges with poor habitat or are in close contact with livestock and their diseases; many are not. Most of these herds are in isolated mountain ranges where there is no longer any interchange of animals from other herds. Thus the herds may be inbred and may have lost resistance to diseases either genetically or through lack of enough exposure to develop an immune response. Yet these mechanisms

are poorly understood. What degree of interchange of animals between mountain ranges is needed to maintain viable populations with sufficient genetic diversity? What level and frequency of exposure to disease is tolerable or desirable so that sheep populations can develop and retain enough resistance to common diseases that catastrophic deaths do not occur. What is the relationship between habitat quality, poor nutrition, human disturbance, and disease? How are these processes correlated with population size? These questions all need to be addressed through well-planned, adequately funded, long-term research. More importantly, these problems cannot be addressed by studying one sheep herd, but require a rangewide perspective.

PROGNOSIS

Complete implementation of this plan for habitat management together with the efforts of other state and federal agencies and private groups should allow for a substantial recovery of desert bighorns. Elsewhere, I have suggested that a recovery of desert bighorn numbers from 10,000 to 50,000 in the next 25 years is possible with proper management (Cooperrider 1985). This would be comparable to the recovery of other ungulates in North America, such as mule deer and pronghorn antelope, that occurred in the early part of this century. BLM cannot bring about such a recovery alone; it will require cooperation and contributions from many private and public agencies and institutions as well as the work of many dedicated individuals. Nevertheless, BLM's effort will be a critical and necessary part of this effort.

SUMMARY

Recovery of desert bighorn sheep in the southwestern United States largely depends on habitat management. The BLM manages a major portion of the historic and current range of the desert bighorn. Although BLM has been involved in desert bighorn management for many years, new funding and direction from Congress has encouraged and strengthened this effort. Implementation of a rangewide desert bighorn sheep plan by BLM should allow for a substantial recovery of sheep within the next 25 years.

ACKNOWLEDGEMENTS

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Table 1. Number of ^{deer}bighorn sheep, acreage of habitat and potential habitat on BLM lands in 1973.

	Estimated number bighorns on BLM lands	Acres of occupied bighorn habitat	Estimated number of reintroduction sites	Estimated acres of unoccupied bighorn habitat
Arizona	3,000	14,000,000	4	170,000
California	3,000	2,500,000	13	340,000
Nevada	700	6,150,000	51	4,461,000
New Mexico	20	100,000	15	711,000
Utah	300	2,600,000	8	700,000
Total:	7,020	25,350,000	91	6,382,000

Source: from Yoakum 1973.

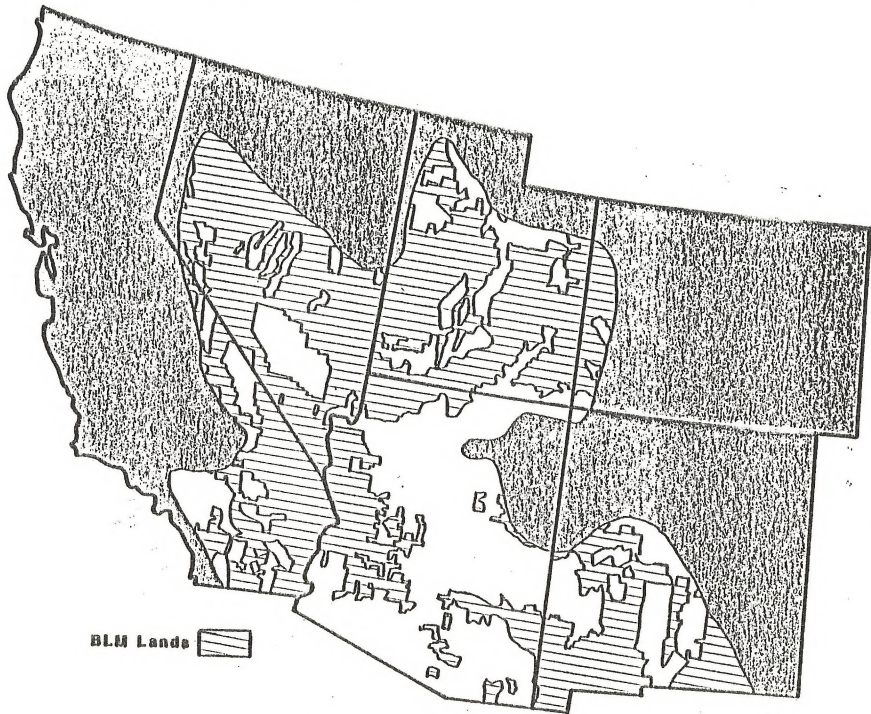


Figure 1. Historic range of desert bighorn sheep and current BLM lands.

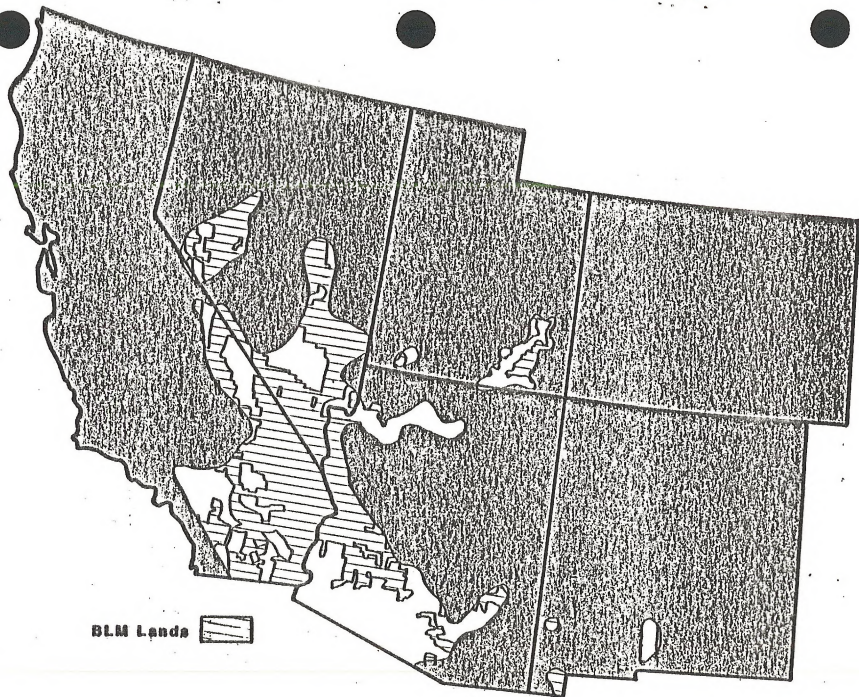
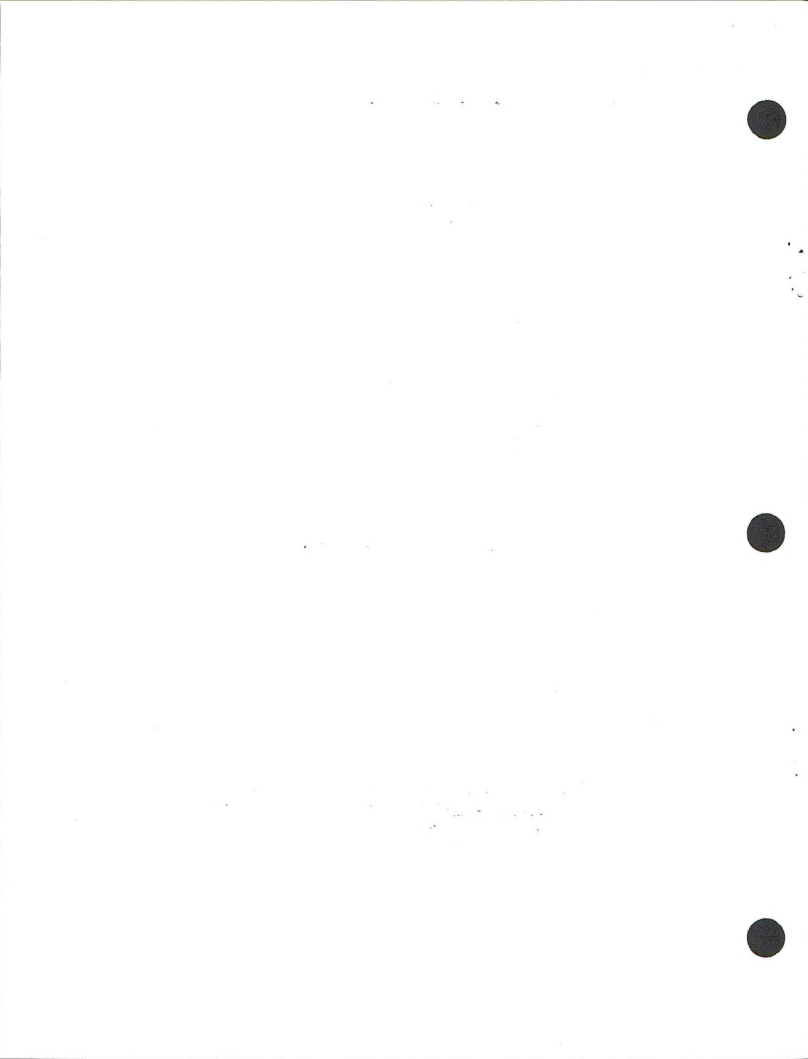


Figure 2 - Current range of desert bighorn sheep and current BLM lands.

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Attachment II. Information Requested for Inclusion in BLM Rangewide Desert Bighorn Management Plan.

Please submit information for parts I, II, and III as thoroughly as possible. If information is not available or not known, please so indicate.

I. Current Status and Future Potential

Please submit the following:

A. For existing desert Bighorn herds which make some use of BLM lands.

1. A map of the state depicting the present desert bighorn habitat management units and the names of the units.
2. Basic data for each management unit.
 - a. The BLM acreage for each management unit and the percentage that BLM lands contribute to the total habitat management area.
 - b. The estimated population and subspecies of desert bighorn inhabiting the management unit.

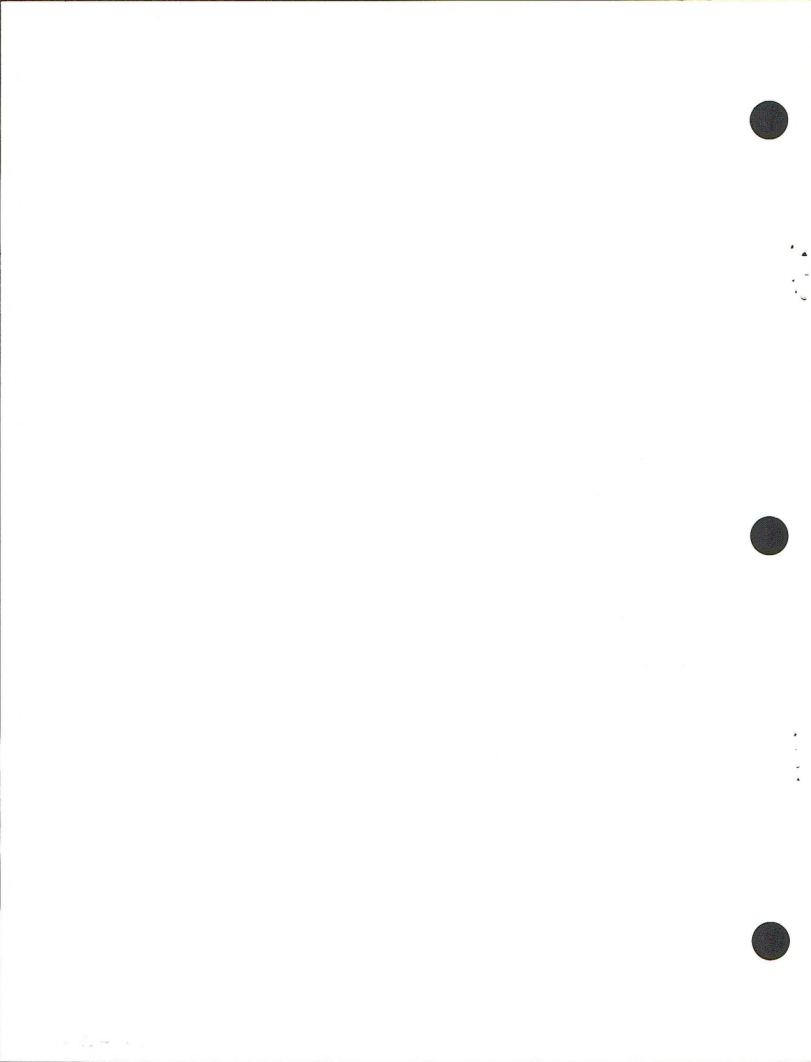
Following is an example of the information that should be noted for each management unit boundary:

Name: Gold Hill Mountains
BLM Acreage: 180,000 Acres
Percent BLM: 72%
Population Estimate: 390
Subspecies: Nelson's

B. Areas of Historic Range Which are Now Managed by BLM

1. A map of the state depicting the potential desert bighorn management areas suitable for reintroductions of desert bighorns and the names of the units.
2. Basic data on potential habitat and populations.
 - a. The BLM acreage for each management unit and the percentage that BLM lands contribute to the total potential habitat management area.
 - b. The estimated population the area could support and the subspecies of desert bighorn that would be reintroduced.

Display the information for the potential areas the same as shown above for the existing populated management areas.



II. Priorities for Desert Bighorn Sheep Management and Funds in State.

Please list in priority order, beginning with most important, the following information:

1. Area (From I above):
2. Objective:
e.g., maintain existing population, stabilize declining herd, mitigate for development, obtain basic management data, etc.
3. Projects (to the extent known):
e.g., habitat inventory, water development, protective fencing, reseeding, reintroduction, habitat/population monitoring, etc.
4. Reason(s) for priority:
e.g., state agency priority, threatened or endangered population or subspecies, completed AMP or HMP, serious livestock conflicts, matching funding, completion of ongoing effort, etc.

Following is an example:

Name: McCain Valley

Objective: Maintain Existing Population

Projects: Burning, reseeding, protective fencing, water development

Reason(s) for priority: State listed subspecies, state agency priority, land use conflicts, declining population.

III. BLM Priorities

On the following sheet are factors being considered for determining Bureauwide priority for projects. Please indicate for each category whether you think it should be high (H), medium (M), low (L), or not-a-factor (NA) from the Bureauwide perspective. Any additional narrative would be welcome. Also, please list any additional factors that should be considered and your recommended weighting (high, medium, low).

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Ranking of Factors for Determining BLM Funding Priorities

___ Subspecies Present:

- ___ Mexican Bighorn
- ___ Nelson's Bighorn
- ___ Peninsular Bighorn

___ Potential Habitat For:

- ___ Mexican Bighorn
- ___ Nelson's Bighorn
- ___ Peninsular Bighorn

___ State Wildlife Agency Ranking
(Management of Existing Herds)

___ State Wildlife Agency Ranking
(Reintroduction)

___ Livestock Conflicts (To be Resolved
by Projects)

___ Absence of Livestock Grazing or Conflicts

___ Absence of Recreational Conflicts

___ Absence of other Land Use Conflicts

___ High percentage of BLM Land

___ Maintenance of Existing Herds/Habitat

___ Restoration of Historic Habitat

___ Reintroduction of Herds

___ Increase of Existing Herds/Expansion of Range Occupied by Herd

___ Large Populations/High Density Herds

___ Small Populations/Low Density Herds

___ Large Areas of Continuous Habitat

___ Small Areas With Isolated Herds



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